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10/606,623	06/25/2003	Bradley F. Eid	11336-538 (P03114US)	5038
757 7590 07/02/2007 BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610			EXAMINER FAULK, DEVONA E	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/606,623	Applicant(s) EID ET AL.	
	Examiner Devona E. Faulk	Art Unit 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-58 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8, 10, 18-20, 28, 29, 35 and 36 is/are allowed.
- 6) ☒ Claim(s) 4-7, 9, 11-17, 21-27, 30-34, 38-43, 45-48, 50-54 and 56-58 is/are rejected.
- 7) ☒ Claim(s) 44, 49 and 55 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Remarks

1. Claims 17 and 36 were indicated as allowable and remain in allowable form.
2. Claims 8,10,18-20,28,29,35 were objected to as being dependent upon a rejected base claim.
3. The applicant has rewritten claims 8,10,18,28,29 and 35 in independent form. Claims 8,10,18,28,29 and 35 are in allowable form.
4. The applicant has amended claims 4,21,37 and 38 to overcome the prior art used in the previous office action.
5. Upon further searching the examiner has found a secondary reference to Waller.
6. The applicant has added new claims 39-58.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
8. Claims 11-14,41-43,52-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 11-14 recite a "... further low frequency input signal...". Claims 41-43,52-54 recite , "initial low frequency input signals..". The examiner is not clear as to what is meant by a further low frequency input signal or initial low frequency input signal. Clarity is needed.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 4,5,7,9,11,12,15,16,21,22,24-26,33,34,37-40, 45,46,47,48,50,51,56,57 and 58 and rejected under 35 U.S.C. 103(a) as being unpatentable over Gerzon (US 5,757,927) in view of Waller, Jr. et al. (US 7,035,413).

Regarding claim 4, Gerzon discloses a method for processing a plurality of audio input signals into a plurality of audio output signals, comprising:

producing a plurality of low frequency input signals that comprise portions of the plurality of audio input signals that are at most about a cut-off frequency (Figure 10);

producing a plurality of high frequency input signals that comprises portions of the plurality of audio input signals that are at least about the cut-off frequency (Figure 10)

decoding the plurality of high frequency input signals into a plurality of high frequency output signals according to a matrix decoding technique (matrix 23, Figure 10);

maintaining each of the plurality of low frequency input signals separately from each other, where the plurality of high frequency output signals and the plurality of low frequency signals are included in the plurality of audio output signals (Figure 10).

Gerzon fails to disclose bypassing decoding of the plurality of low frequency input signals by any matrix decoding technique (Figure 1).

Waller discloses bypassing decoding of the plurality of low frequency input signals by any matrix decoding technique (see abstract; column 4, lines 46-62).

It would have been obvious to modify Gerzon by bypassing decoding of the low frequency signals in order to maintain maximum true audio performance in the output channels (Waller, column 1, lines 48-52).

All elements of claims 5,7,9,11,12,15,16 are comprehended by the rejection of claim 4 (regarding claim 5; Gerzon discloses a crossover frequency of 400 Hz in column 16, lines 9-10; regarding claim 7, the matrix 23 does up-mixing; regarding claim 9, Gerzon discloses filters for removing frequencies above a cut-off frequency).

Claims 21,22,37,39,40,45,46,47,48,50,51,56,57 and 58 are rejected with Gerzon and Waller as applied to the rejection of claim 4.

Claims 24-26,33,34 are comprehended by Gerzon and Waller as applied to the rejection claim 4(matrix 23 implicitly comprises a mixer; a low pass filter is illustrated in Gerzon; there is a second mixer, adders, which mix the low and high frequency input signals).

11. Claims 6 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerzon (US 5,757,927) in view of Waller, Jr. et al. (US 7,035,413) in further view of Vaughn et al. (US 2004/0114771).

Gerzon as modified fails to disclose customizing the audio output signals for a listening environment. Vaughan et al teach a multi-channel audio system which has an

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equalization coefficient memory set which is customized for a particular vehicle (listening environment, Figure 1). The benefit of such customization was to create an ideal listening environment for many types of environments. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Gerzon et al to include customization, as taught by Vaughan et al, for the purpose of customizing the surround sound listening environment.

12. Claims 13,14,27 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerzon (US 5,757,927) in view of Waller, Jr. et al. (US 7,035,413) in further view of Liu (US 6,349,285).

Gerzon as modified fails to disclose producing a further low frequency input signal using low frequency effects signal. Liu discloses a bass management system comprising a plurality of input signals L, R, C, Ls, Rs, and LFE (low frequency effects). Subwoofer summing module 602 acts as the bass management system which produces a plurality of low frequency input signals including LFE (see figure 8). The subwoofer signal (SUB) is produced using the low frequency effects signal. The use of the LFE signal increases the realism of the audio environment. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Gerzon as modified to include the LFE signal, as disclosed by Liu, for the purpose of improving the audio quality of the surround sound system. Claims 13 and 14 are rejected. As to claim 27, Liu discloses a left surround input signal which is in communication with low pass filter 803. As to claims 30-32, the subwoofer signal is a further low frequency input signal which uses the LFE signal.

Claim Objections

13. Claims 44,49,55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Allowable Subject Matter

14. Claims 8,10,17-20,28,29,35 and 36 are allowed.

15. The following is a statement of reasons for the indication of allowable subject matter: Regarding claims 8,10,17-20,28,29,35 and 36, prior art Gerzon discloses a surround sound apparatus. Prior art Waller discloses a dynamic spectral matrix surround system. Prior art Liu discloses audio bass management methods and circuits and systems using the same. Prior art Ito discloses a decoder for use in a 4-2-4 matrix playback system. Prior art Gerzon (US 5,594,800) discloses a sound reproduction system having a matrix converter.

Regarding claim 8, the prior art or combination thereof fails to disclose or make obvious where producing at least one additional high frequency output signal comprises combining the plurality of low frequency signals with the plurality of high frequency output signals.

Regarding claim 10, the prior art or combination thereof fails to disclose or make obvious where producing the plurality of low frequency input signals comprises producing an initial plurality of low frequency input signals; and producing the plurality of low frequency signals as function of the initial low frequency input signals.

Regarding claim 17, the prior art or combination thereof fails to disclose or make obvious a method for processing a left-front input signal, a right-front input signal, a center audio input signal, a left-surround input signal, and a right-surround input signal into a left-front output signal, a right-front output signal, a center output signal, a left-side output signal, a right-side output signal, a left-rear output signal, and a right-rear output signal, the method comprising: producing an initial left -front low frequency input signal, an initial right-front low frequency input signal, an initial center low frequency input signal, an initial left-surround low frequency input signal, and an initial right-surround low frequency input signal by removing frequencies that are above about a cut-off frequency from the left-front, right-front, center, left-surround, and right-surround input signals, respectively; producing a left-front low frequency input signal, a right-front low frequency input signal, a center low frequency input signal, a left-side low frequency input signal, a right-side low frequency input signal, a left-rear low frequency input signal, and a right-rear low frequency input signal as a function of the initial left-front, initial right-front, initial center, initial left-surround, and initial right-surround low frequency input signals; producing a left-front high frequency input signal, a right-front high frequency input signal, a center high frequency input signal, a left-surround high frequency input signal and a right-surround high frequency input signal by removing frequencies that are below

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about the cut-off frequency from the left-front, right-front, center, left-surround, and right-surround input signals, respectively; decoding the left-front, right-front, center, left-surround, and right-surround high frequency input signals into a left-front high frequency output signal, a right-front high frequency output signal, a center high frequency output signal, a left-side high frequency output signal, a right-side high frequency output signal, a left-rear high frequency output signal, and a right-rear high frequency output signal according to a matrix decoding technique; causing the left-front, right-front, center, left-side, right-side, left-rear, and right-rear low frequency input signals to forgo the matrix decoding technique; and maintaining each of the left-front, right-front, center, left-side, right-side, left-rear, and right-rear low frequency input signals separately from each other, where left-front, right-front, center, left-side, right-side, left-rear, and right-rear low frequency input signals, and the left-front, right-front, center, left-side, right-side, left-rear, and right-rear high frequency output signals comprise the left-front, right-front, center, left-side, right-side, left-rear and right-rear output signals.

Regarding claim 18, the prior art or combination thereof fails to disclose or make obvious here the method for processing the plurality of audio input signals into a plurality of audio output signals comprises processing a left-front input signal, and a right-front input signal into a left-front output signal, a right-front, center output signal, a left-surround output signal, and a right-surround output signal; producing the plurality of low frequency input signals comprises producing a left-front low frequency input signal, and a right-front low frequency input signal by removing frequencies that are above about the cut-off frequency from the left-front, and right-front,

input signals, respectively; and producing a further low frequency input signal as a function of the left-front, and right-front low frequency input signals; producing the plurality of high frequency input signals comprises producing a left-front high frequency input signal, and a right-front high frequency input signal by removing frequencies that are below about the cut-off frequency from the left-front, and right-front input signals, respectively; decoding the plurality of high frequency input signals comprises decoding the left-front, and right-front high frequency input signals into a left-front high frequency output signal, a right-front high frequency output signal, a center high frequency output signal, a left-surround high frequency output signal, and a right-surround high frequency output signal according to the matrix decoding technique; communicating the plurality of low frequency input signals comprises communicating the left-front, right-front, and further low frequency input signals so as to bypass any decoding by the matrix decoding technique; and maintaining each of the plurality of low frequency input signals separately from each other comprises maintaining each of the left-front, right-front, and further low frequency input signals separately from each other.

Regarding claim 28, the prior art or combination thereof fails to disclose or make obvious where the bass management module comprises a low-pass filter comprising the cut-off frequency, in communication with the low-pass filter, and configured to produce one of the plurality of low frequency signals from a subset of the plurality of initial low frequency input signals.

Regarding claim 29, the prior art or combination thereof fails to disclose or make obvious where the plurality of audio input signals comprises a left-front input signal, a right-front input signal, and the low pass filter produces an initial left-front low frequency input signal, an initial right-front low frequency input signal, an initial center low frequency input signal, an initial left-surround low frequency input signal and an initial right-surround low frequency input signal, and the bass management system further comprises: a first summation device in communication with and configured to produce a left-front low frequency input signal from the initial left-front, and initial center low-frequency input signals; a second summation device in communication with and configured to produce a right-front low frequency input signal from the initial right-front and initial center low-frequency input signals; a third summation device in communication with and configured to produce a left-side low frequency input signal from the initial left-front, initial right-front, and initial left-surround low frequency input signals; and a fourth summation device in communication with and configured to produce the a right-side low frequency input signal from the initial left-front, initial right-front, and initial right-surround low frequency input signals.

Regarding claim 35, the prior art or combination thereof fails to disclose or make obvious where the matrix decoder comprises an adjustment module in communication with at least one of the high frequency output signal and is configured to produce at least one additional high frequency output signal.

Regarding claim 36, the prior art or combination thereof fails to disclose or make obvious a matrix decoder module in communication with the bass management module,

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and configured to decode the left-front, and right-front high frequency input signals into a left-front high frequency output signal, a right-front high frequency output signal, a center high frequency output signal, a left-surround high frequency output signal, and a right-surround high frequency output signal.

Therefore the prior art or combination thereof fails to disclose or make obvious a method for processing a plurality of audio input signals, a method and system for processing a left front input signal, a right front input signal, a center audio input signal, a left surround input signal and a right surround input signal as claimed.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 571-272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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